Materials Sampling, Testing and Acceptance Procedures

Bruce E. Wasill
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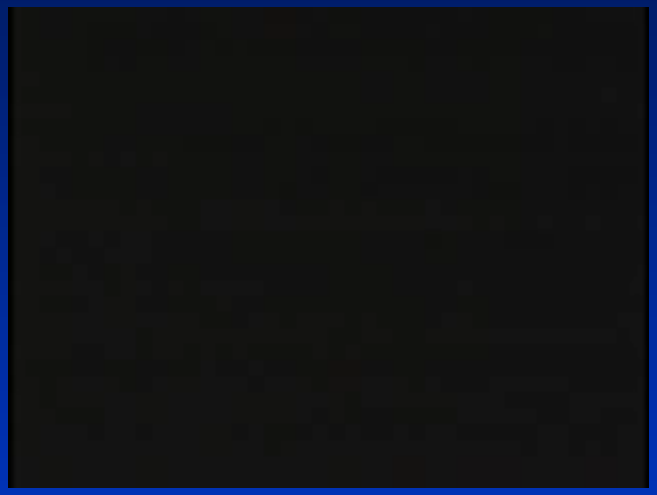
Western Federal Lands Highway Division



Roles and Responsibilities

- Contractor's Role:
  - Construct the Road and Appurtenances
  - Quality Control or Process Control Activities
- Project Engineer's Role:
  - Administer the Contract
  - Acceptance Procedures

Types of Acceptance (FP-03)

- Subsection 106.02 Visual Inspection
- Subsection 106.03 Certification
- Subsection 106.04 Measured or Tested Conformance
- Subsection 106.05 Statistical Evaluation of Work and Determination of Pay Factor (Value of Work)

106.02 Visual Inspection

- Class 6 Riprap
- Seeding Areas
- Plants
- Trees
- Application of Choker Aggregate

106.03 Certification

- Types of Certifications
  - Productions Certifications
    - Steel Plate Culverts
    - Large Concrete Pipes
    - Bridge Girders
  - Commercial Certifications
    - Paint
    - Sign Hardware (nuts & bolts)
    - Fence Materials

106.03 Certification

- Does the contractor need to have multiple certifications for multiple shipments?
- Sic et Non (Yes and No)
  - Production Certifications – 106.03 states, “Require the manufacturer to furnish a production certification for each shipment of material.”
  - Commercial Certifications – 106.03 states, “When a certification is required, but not a production certification, furnish one commercial certification for all similar material from the same manufacturer.”

106.03 Certification

- Does the Project Engineer have to receive a copy of the certification?
- YES
  - 106.03 states, “Maintain records of all required certifications according to Subsections 103.04, 153.04, and 154.04. Submit certifications to the CO.”

106.03 Certification

- Can you inspect or test items accepted by Certification?
- YES
  - 106.03 states, “Materials accepted by certification may be sampled and tested at any time. If found not in conformance with the contract, the material will be rejected whether in place or not.”

106.04 Measured/Tested Conformance

- Accept/Reject Decision – No Pay Factors
  - 106.04 states, “Results from inspection or testing shall have values within the specified tolerances or specification limits.”
  - 106.01 states, “Remove and replace work that does not conform to the contract... or to prevailing industry standards where no specific contract requirements are noted, at no cost to the Government.”

106.04 Measured/Tested Conformance

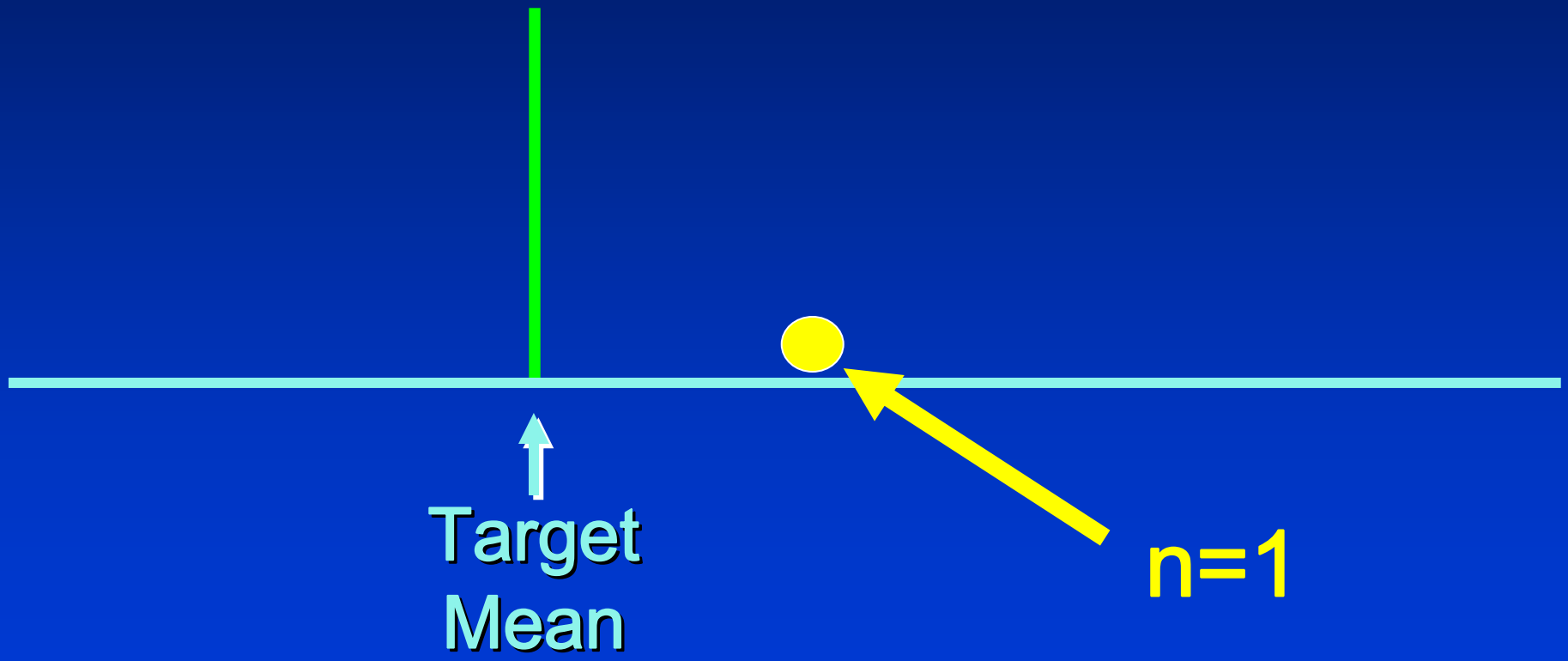
- What happens if the material is “Rejected”?
  - Remove and replace.
  - Make corrections.
  - Accepted at a reduced price. 106.01 states, “As an alternative to removal and replacement, the Contractor may submit a written request to:

    (a) Have the work accepted at a reduced price…”

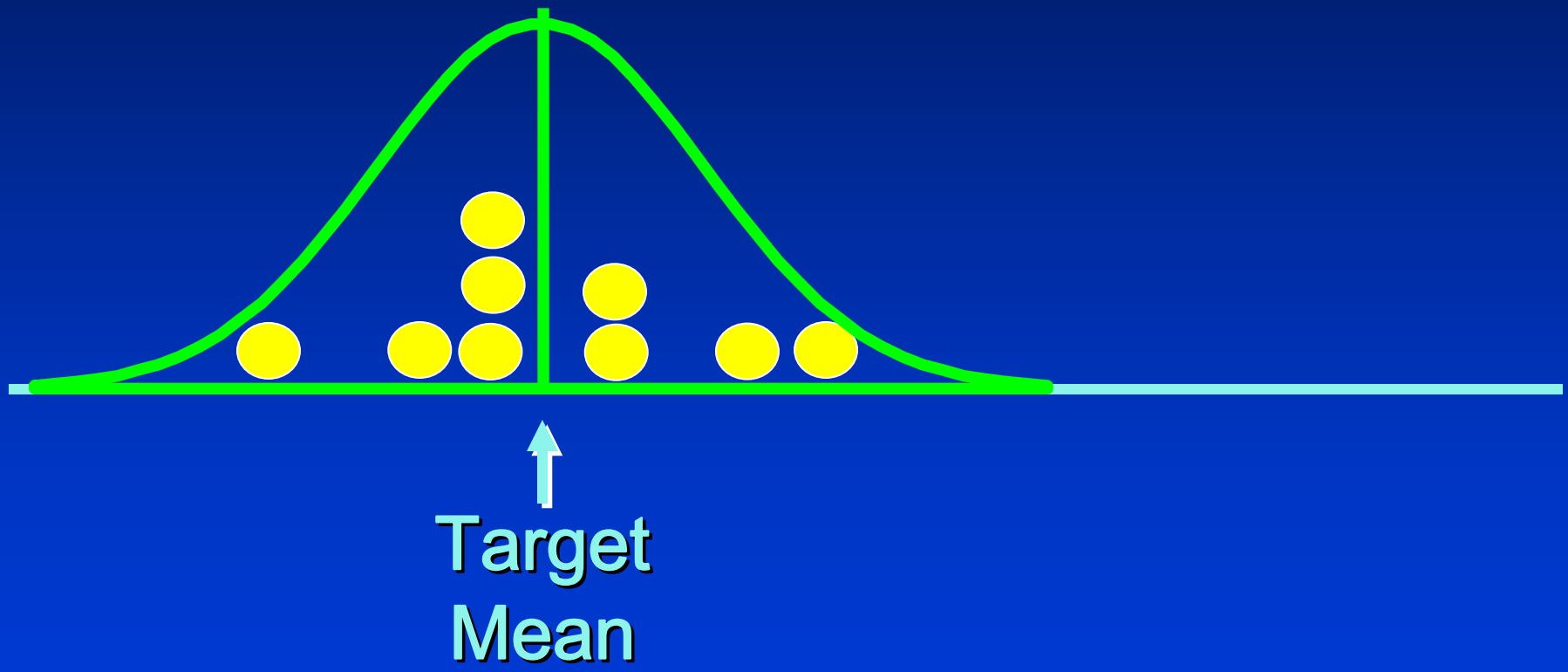
106.05 Statistical Evaluation of Work

- Why use Statistical Acceptance
  - It predefines “Reasonably Close Conformity”
  - AQL = 95 PWL for Category I parameters
  - AQL = 90 PWL for Category II parameters

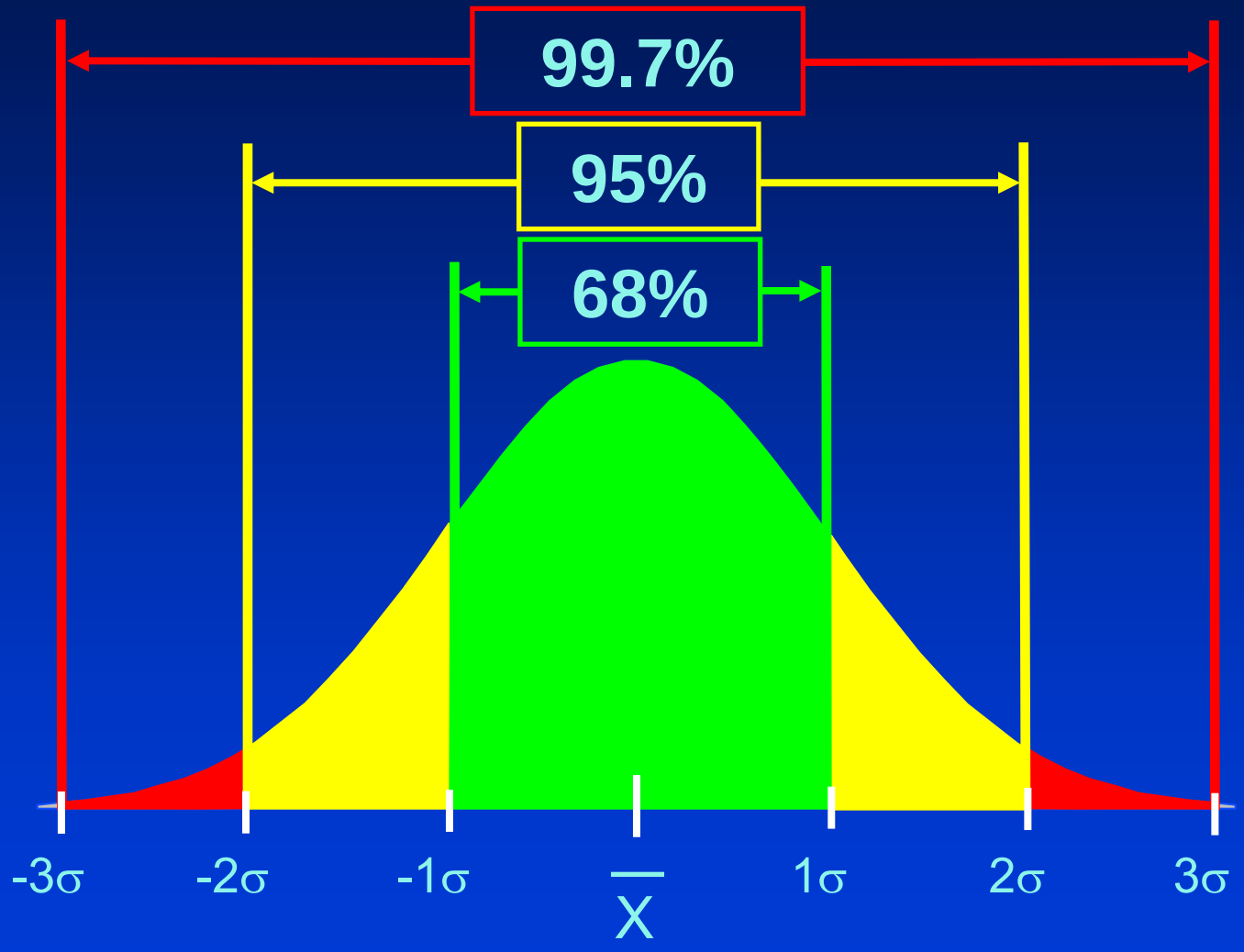
Standard Normal Distribution



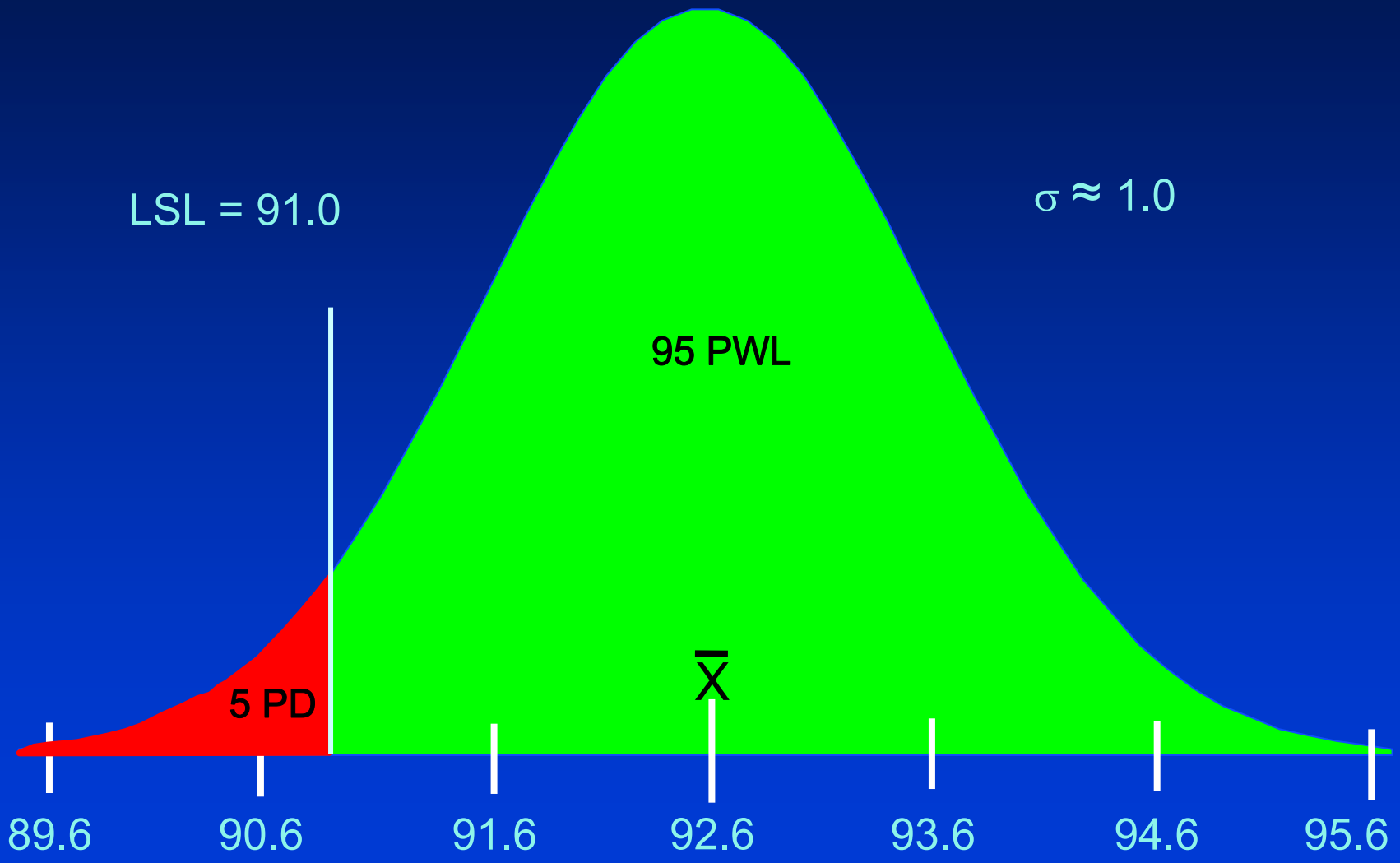
Normal Distribution



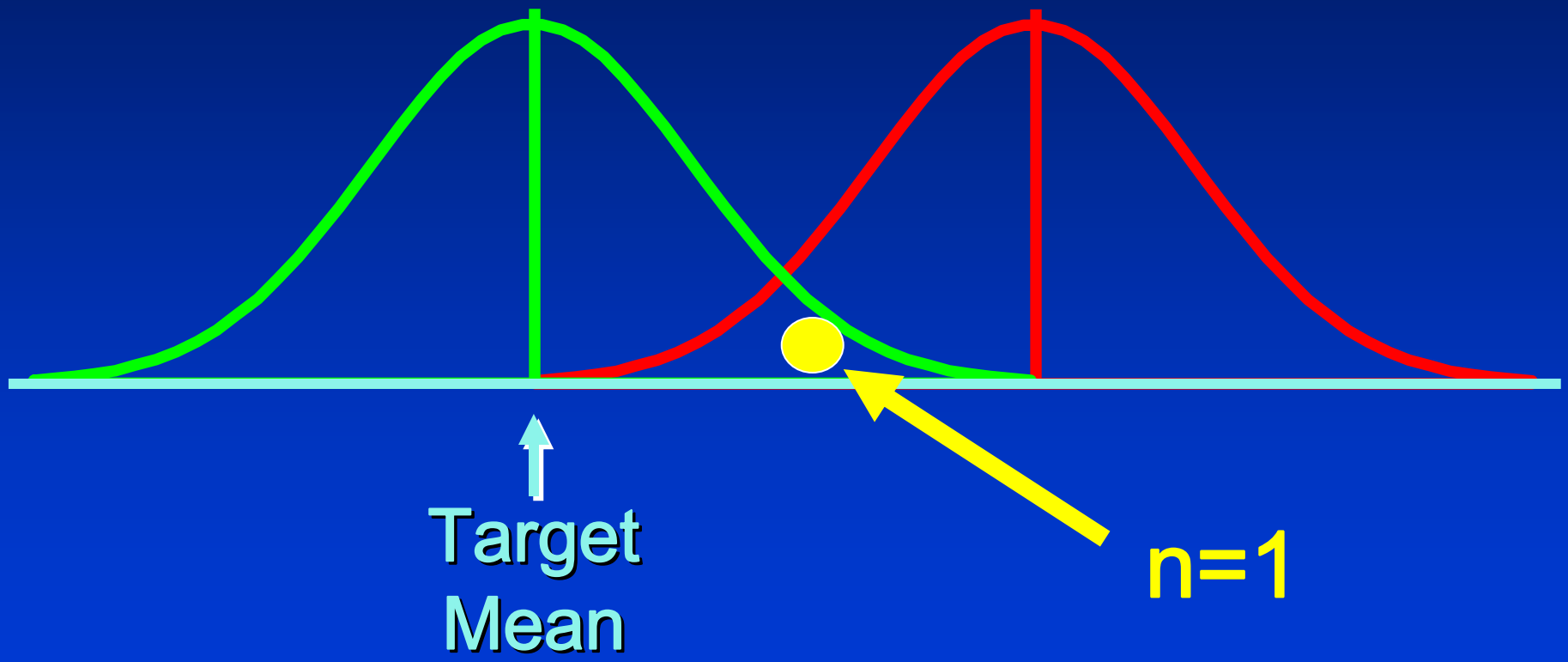
Area Under Normal Distribution



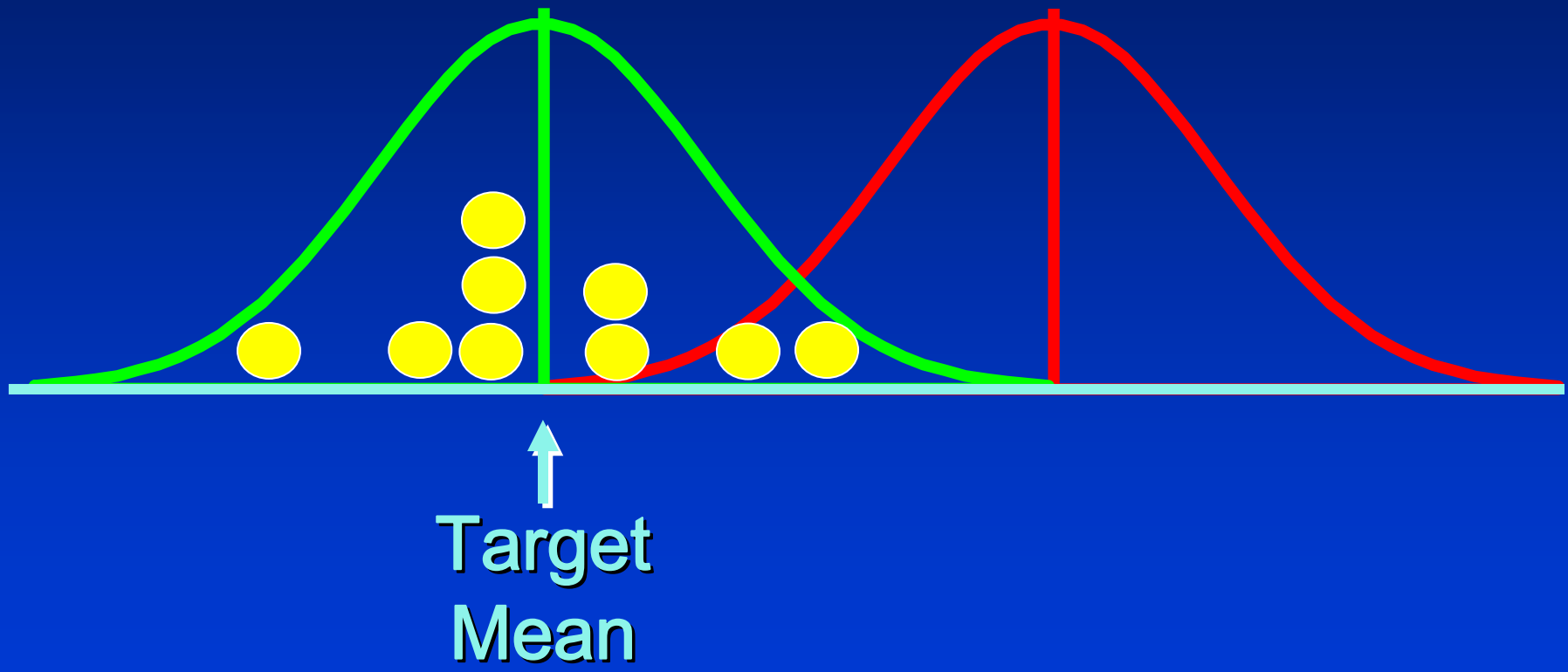
AQL= 95 PWL



Risk vs. Number of Samples



Risk vs. Number of Samples



106.05 Statistical Evaluation of Work

- Why use Statistical Acceptance
  - It predefines “Reasonably Close Conformity”
  - AQL = 95 PWL for Category I parameters
  - AQL = 90 PWL for Category II parameters
  - Contractor’s Risk = 0.05
- QL-Pay
- Rounding AASHTO R 11
  - Absolute Method

Where To Find Information?

- Which acceptance method applies?
- What is the testing frequency?
- Are split samples required?
- What test method is to be used?
- What are the specifications limits?
- Where do we sample the material?
- Who obtains the sample?
- What is the lot size?
- What is …?

Where To Find Information?

- Special Contract Requirements
- Standard Specification Book (FP-03)
- Call for help!
  - Contractors talk to the Project Engineer
  - Project Engineers Call:
  - COE
  - Bruce Wasill (Materials QA Engineer)
  - John Snyder (Materials Engineer)
  - Brad Neitzke (Materials Jedi Master ???)
  - Ryan Hixson (Assistant Materials Engineer)
  - Bob Hacker (Materials Lab Chief)
  - Anyone in Materials

Contractor Quality Control

- Submit Written Quality Control Plan
  - Process Control Test Schedule
  - Inspection/Control Procedures
    - Preparatory Phase
      - Coordinate submittals, certifications, surveying & staking, scheduling equipment, determine personnel needs
    - Start-up Phase
      - Review contract requirements with workers, training, inspection, workmanship
    - Production Phase
      - Conduct reviews, inspect work before requesting acceptance, correct deficiencies in work and in processes

Contractor Quality Control

- Description of Records
  - Contractor Records
  - FHWA Records
  - http://www.wfl.fhwa.dot.gov/other/it/forms/
- Personnel Qualifications (Chain of Command)
  - Identify Subcontractors
- Perform Testing
  - Identify Test Procedures
  - Follow Specified Procedure

Contractor Quality Control

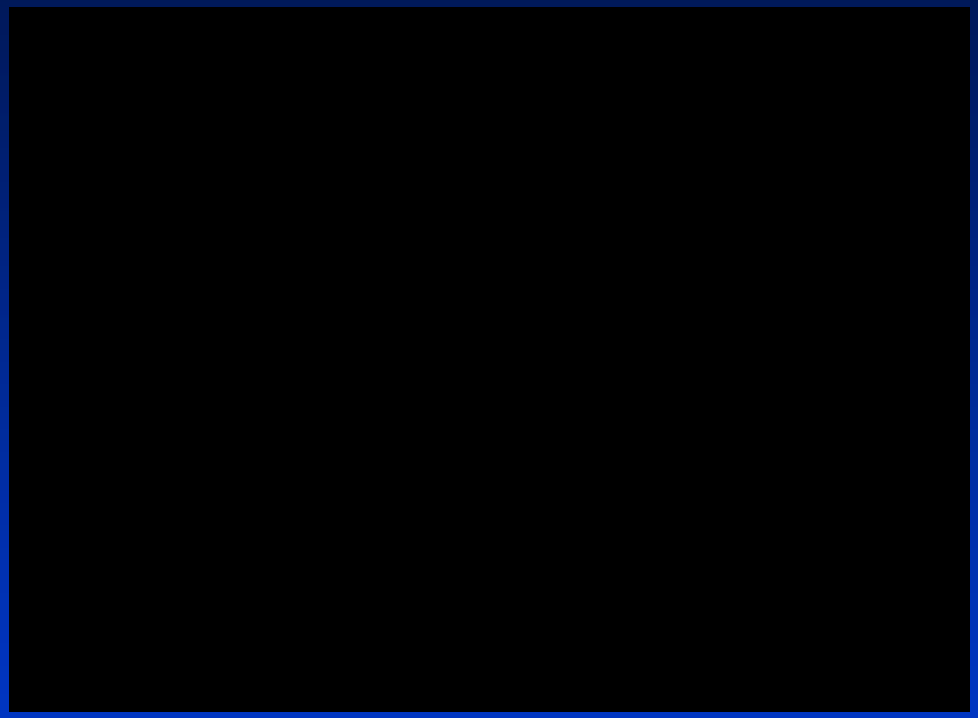
- Maintain Records
  - Clear
  - Concise
  - Neat
  - DO NOT ERASE (should use pen)
  - DO NOT RECOPY

Contractor Quality Control

- Materials Testing Forms
  - Use Appropriate Forms
- Where to find:
  - http://www.wfl.fhwa.dot.gov/other/it/forms/
- Do not use the following FHWA forms:
  - FHWA 1600C, 1600E, 1616, or 1627
  - FHWA 1628 may or may not be used

Contractor Quality Control

1621_02-07.pdf



QL-PAY

- http://www.wfl.fhwa.dot.gov/projects/quality/

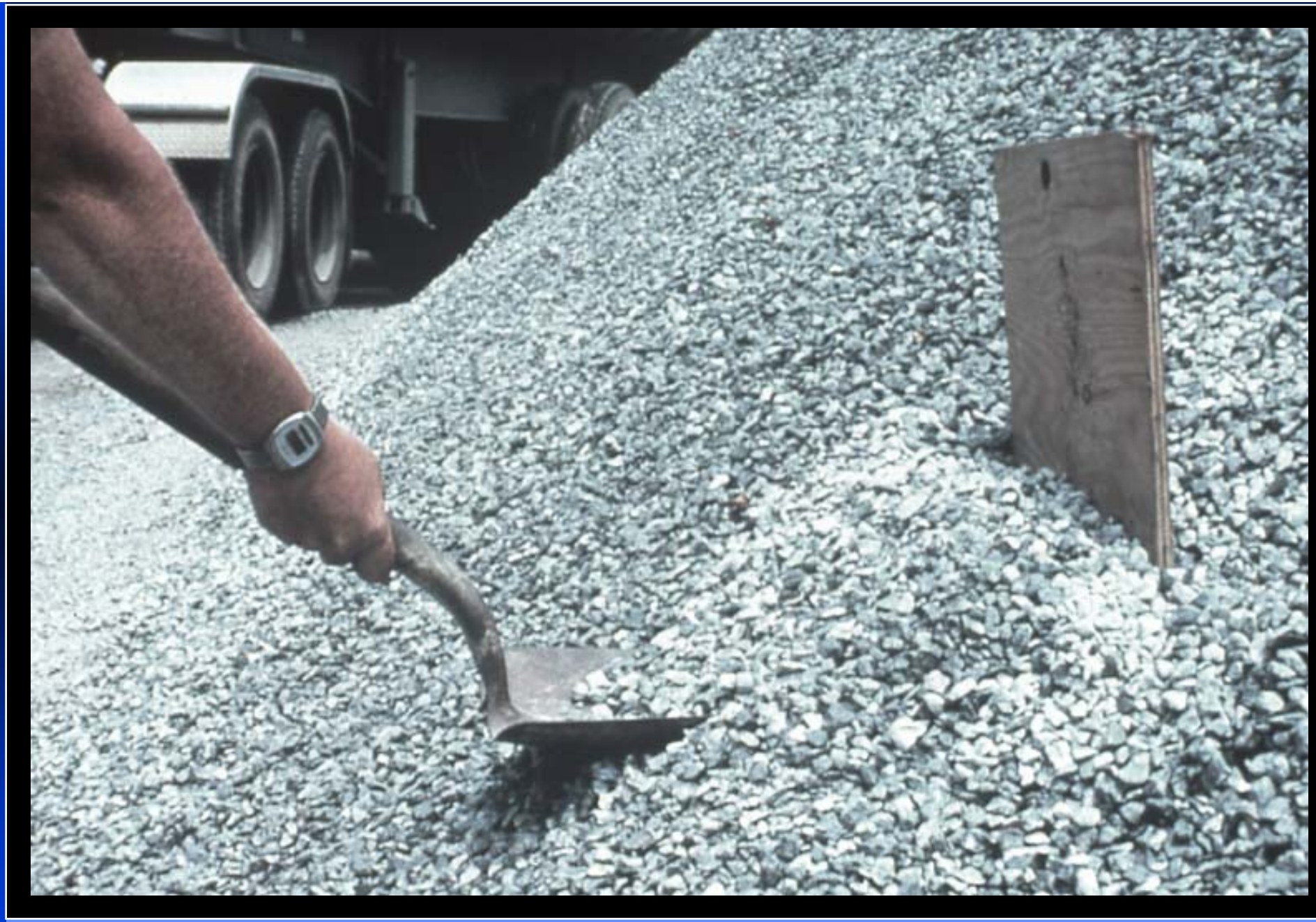
QL-PAY

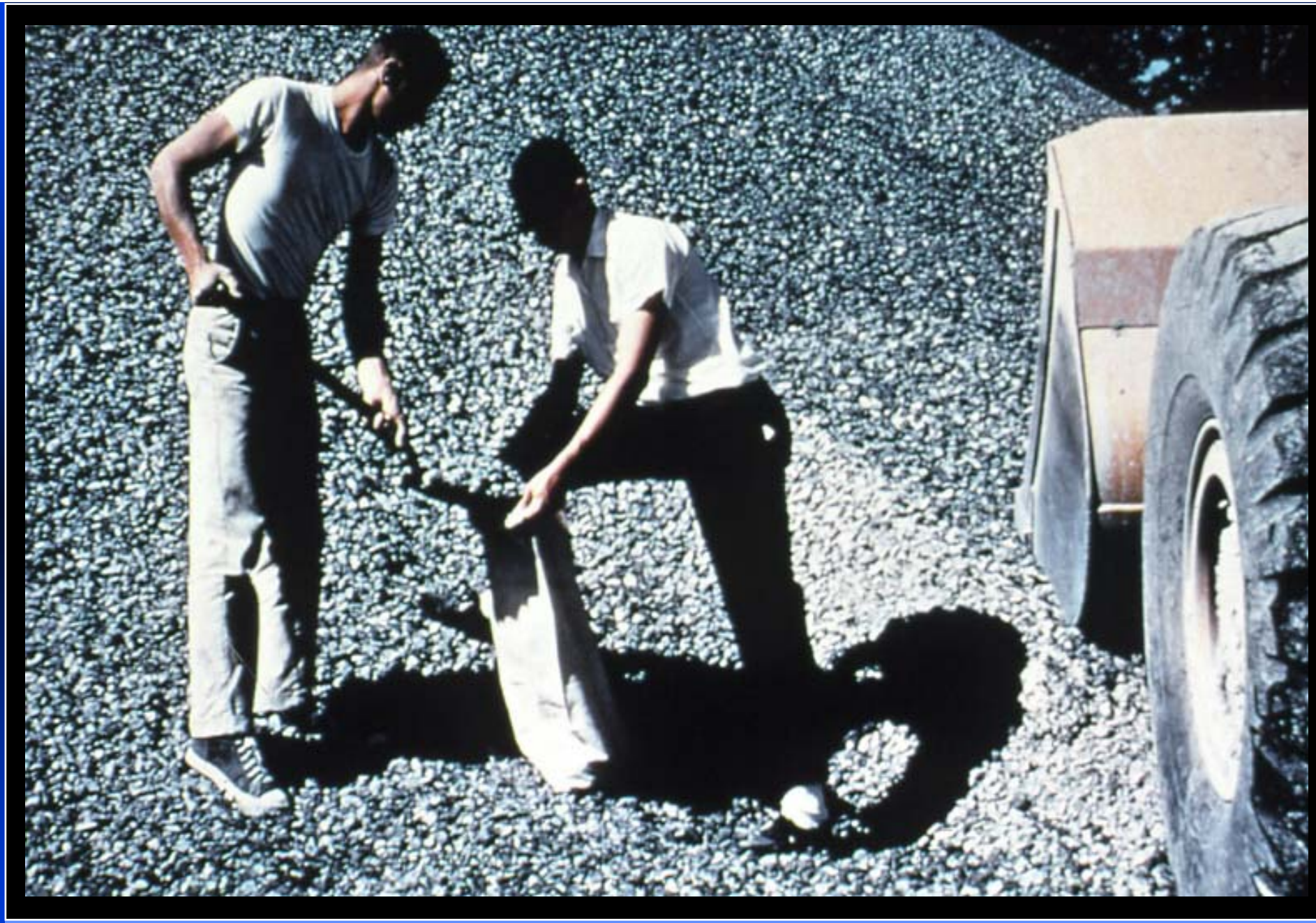
Materials Sampling and Testing

- Minimum Sample Sizes
  - Sampling and Testing Procedures, AASHTO or ASTM
  - Standard Specifications, FP-03
  - Special Contract Requirements
  - Materials Manual

Sampling Aggregates

AASHTO T 2





FHWA Federal Lands Highway


1 FT.

Appropriate Containers

- Plastic Buckets
- Canvas Sacks
- Heavy Woven Plastic Bags
  (tight weaved black or blue bags are OK - Do NOT Use White bags)
- No burlap bags, cardboard boxes or plastic garbage bags

Obtaining Drilled Cores

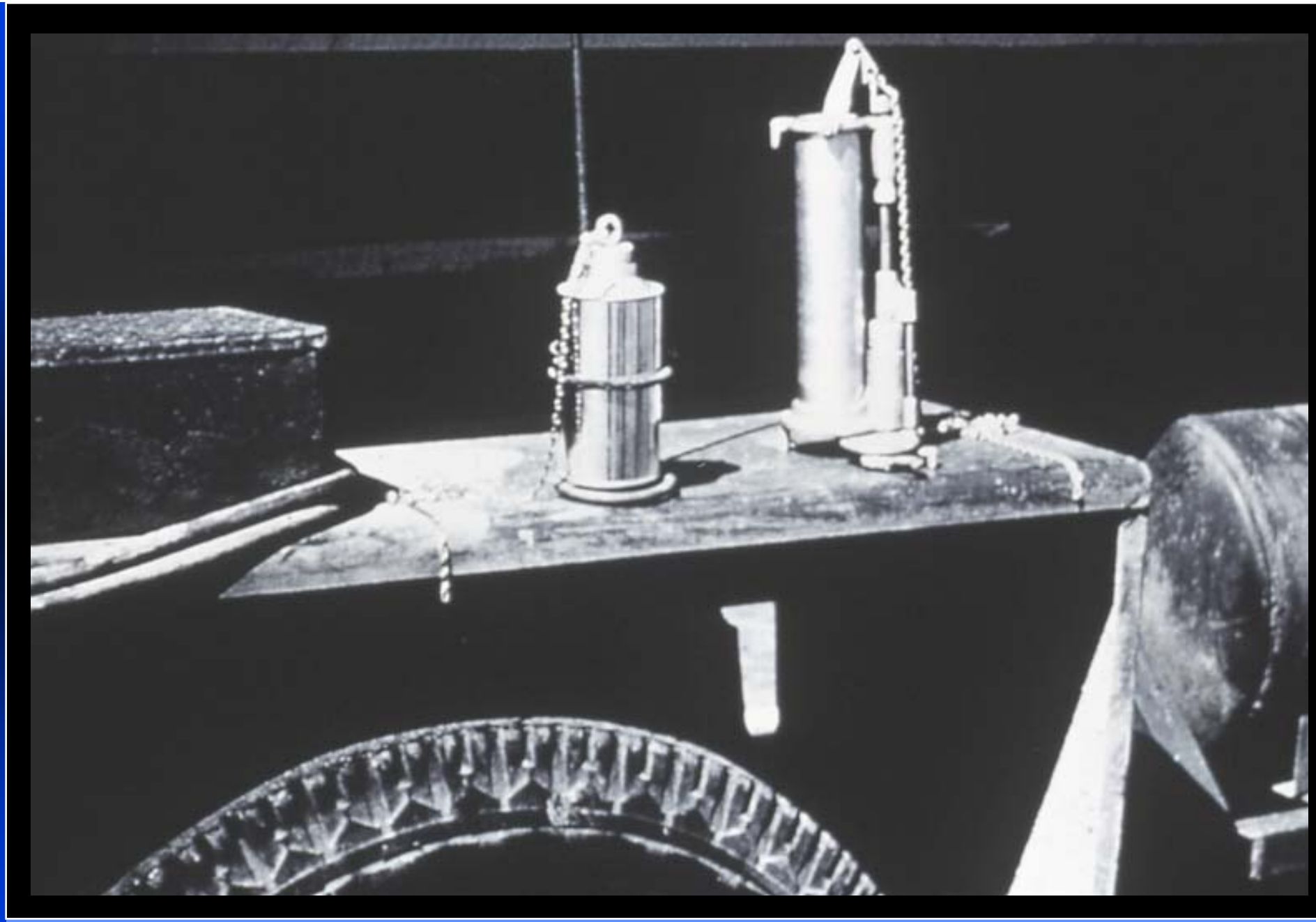
AASHTO T 24

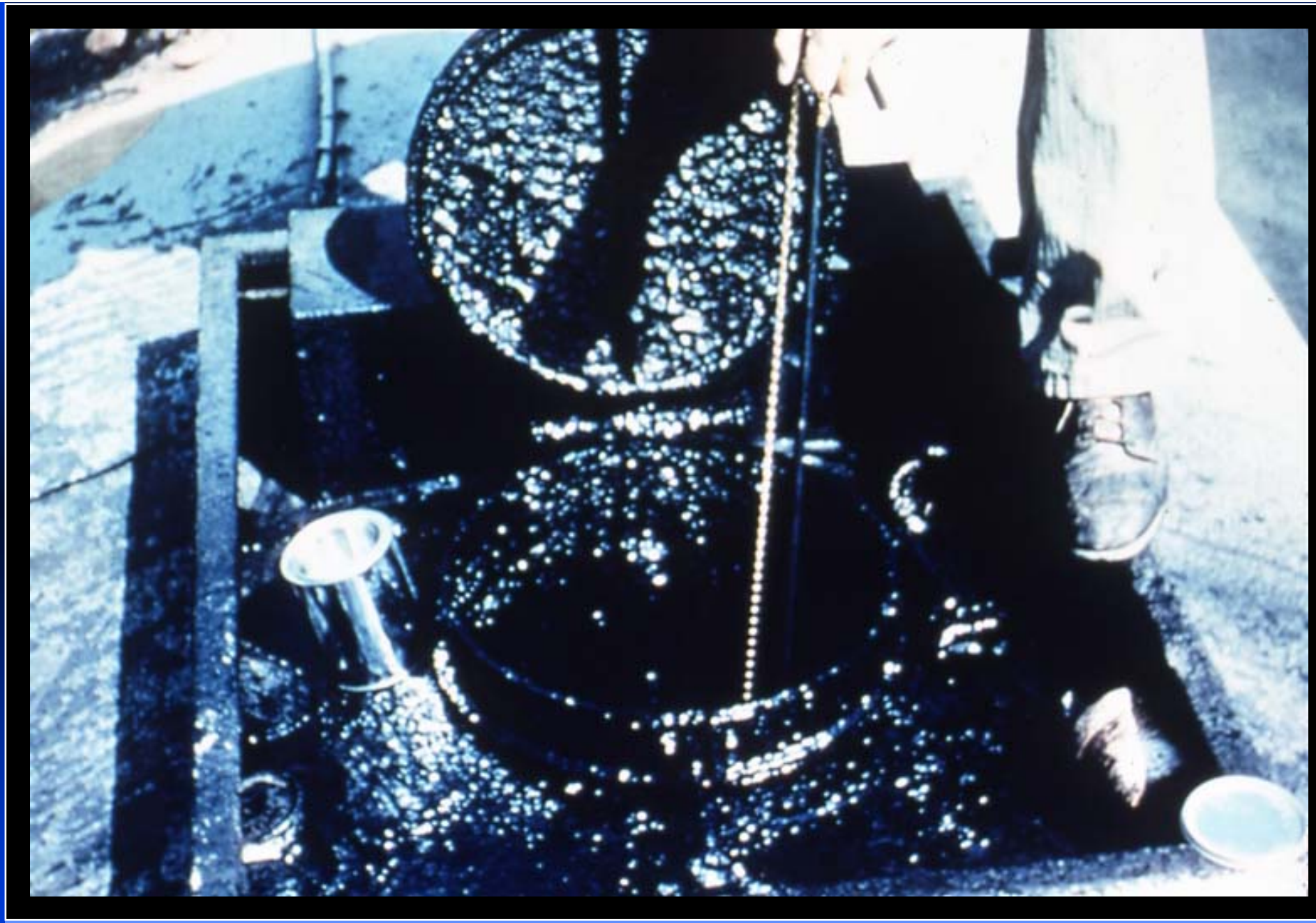
Appropriate Containers

- 6 x 12 Concrete Molds
- 4 x 8 Concrete Molds
- 1 Gallon Cans
- Asphalt Sample Boxes
- Do not pack in Styrofoam peanuts, wet sand or wet sawdust.

Sampling Bituminous Materials

AASHTO T 40





Appropriate Containers

- Asphalt Cement & Cutbacks:
  - One-quart metal cans
- Emulsified Asphalts:
  - One-gallon plastic jugs with screw on lids (preferably with wide mouth lids)
  - Secure lids with duct tape or fiber reinforced wrapping tape!

Sampling Fresh Concrete

AASHTO T 141

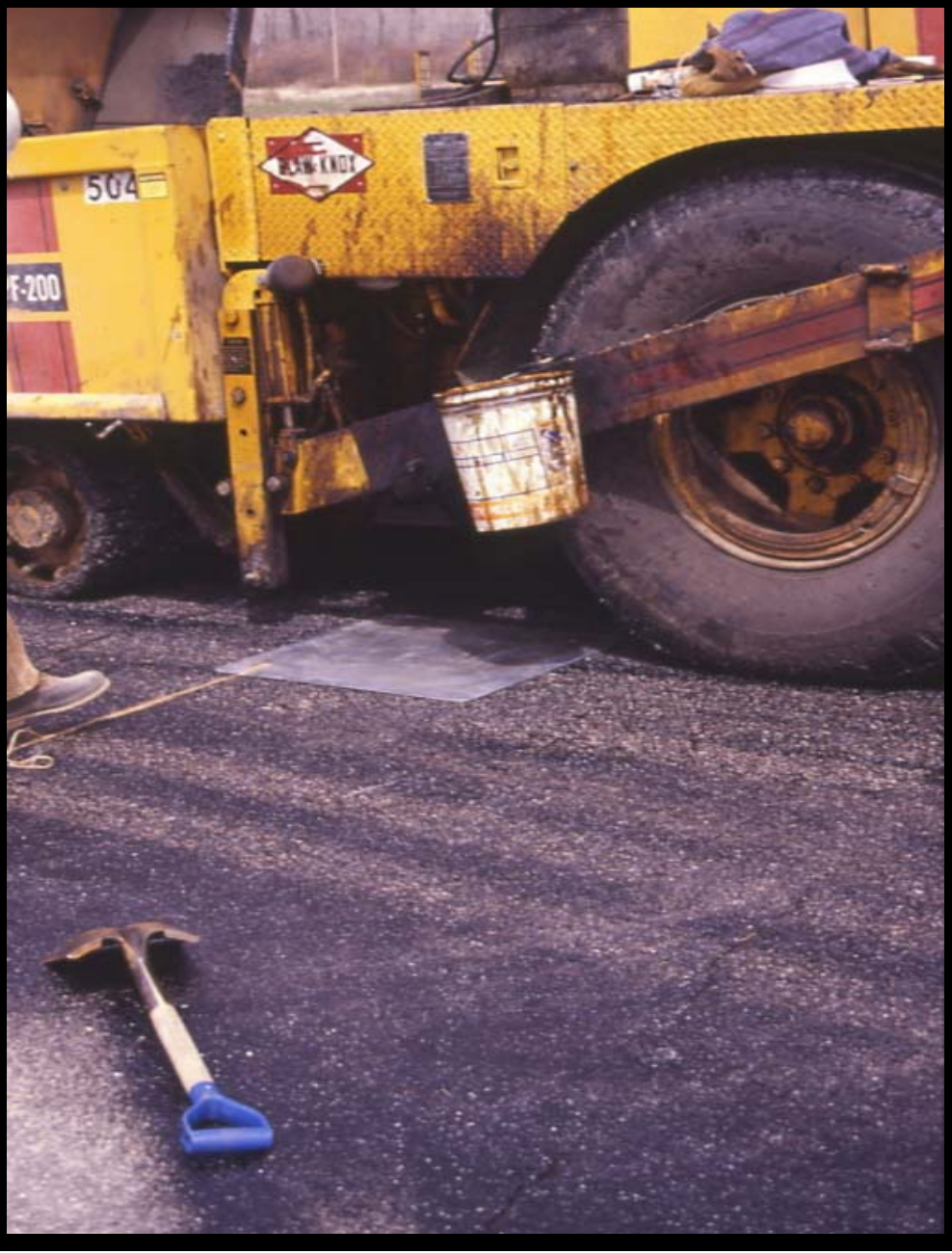
Appropriate Containers

- Plastic Concrete Molds
- Metal Concrete Molds
- 6 x 12 or 4 x 8 Molds Acceptable
- Protection during transport


Federal Hwy. Admin
attn: Materials Lab
610 E. Fifth St
Vancouver, WA.
98661

Sampling Asphalt Paving Mixtures

AASHTO T 168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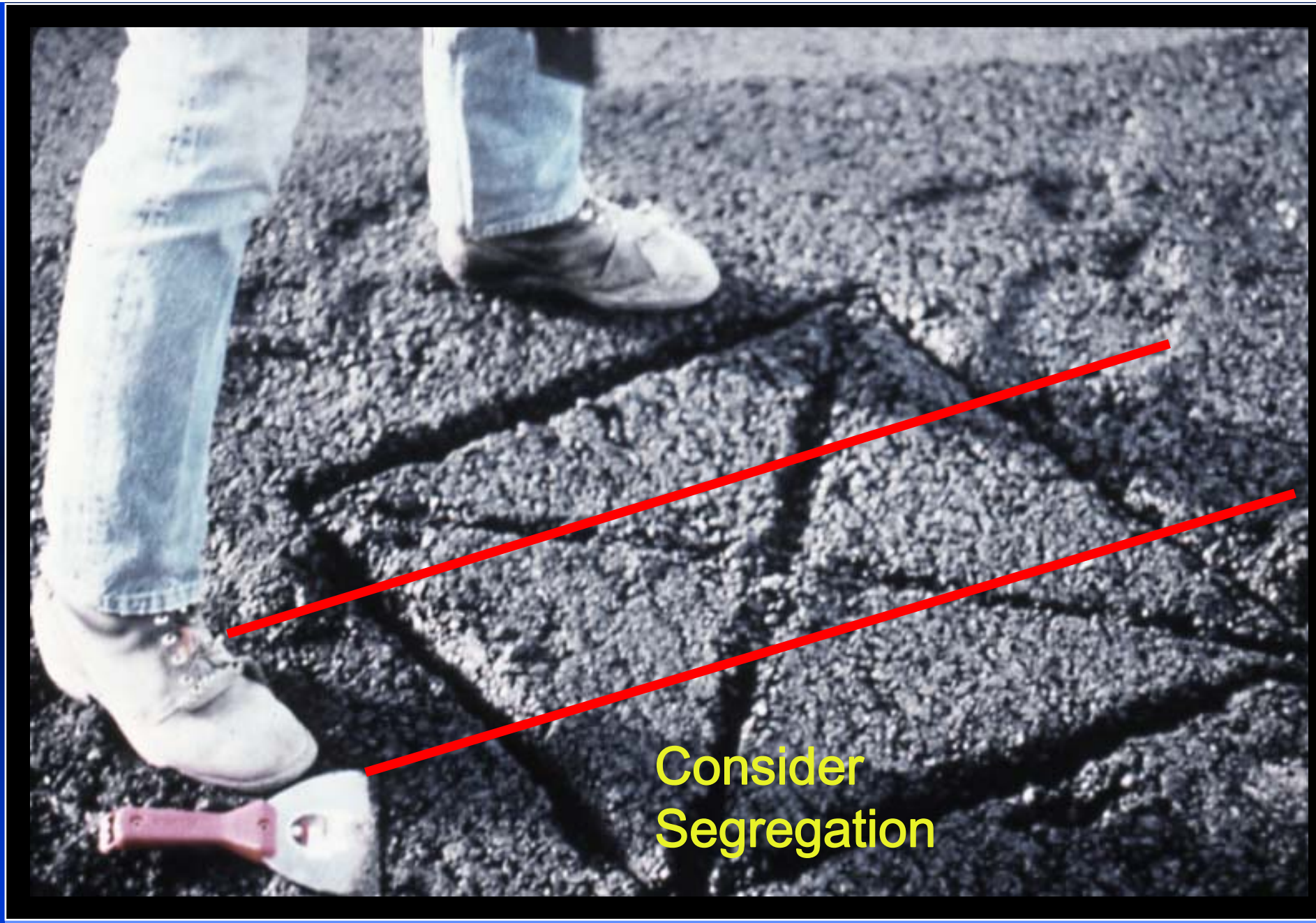
Reducing Field Samples

AASHTO T 248

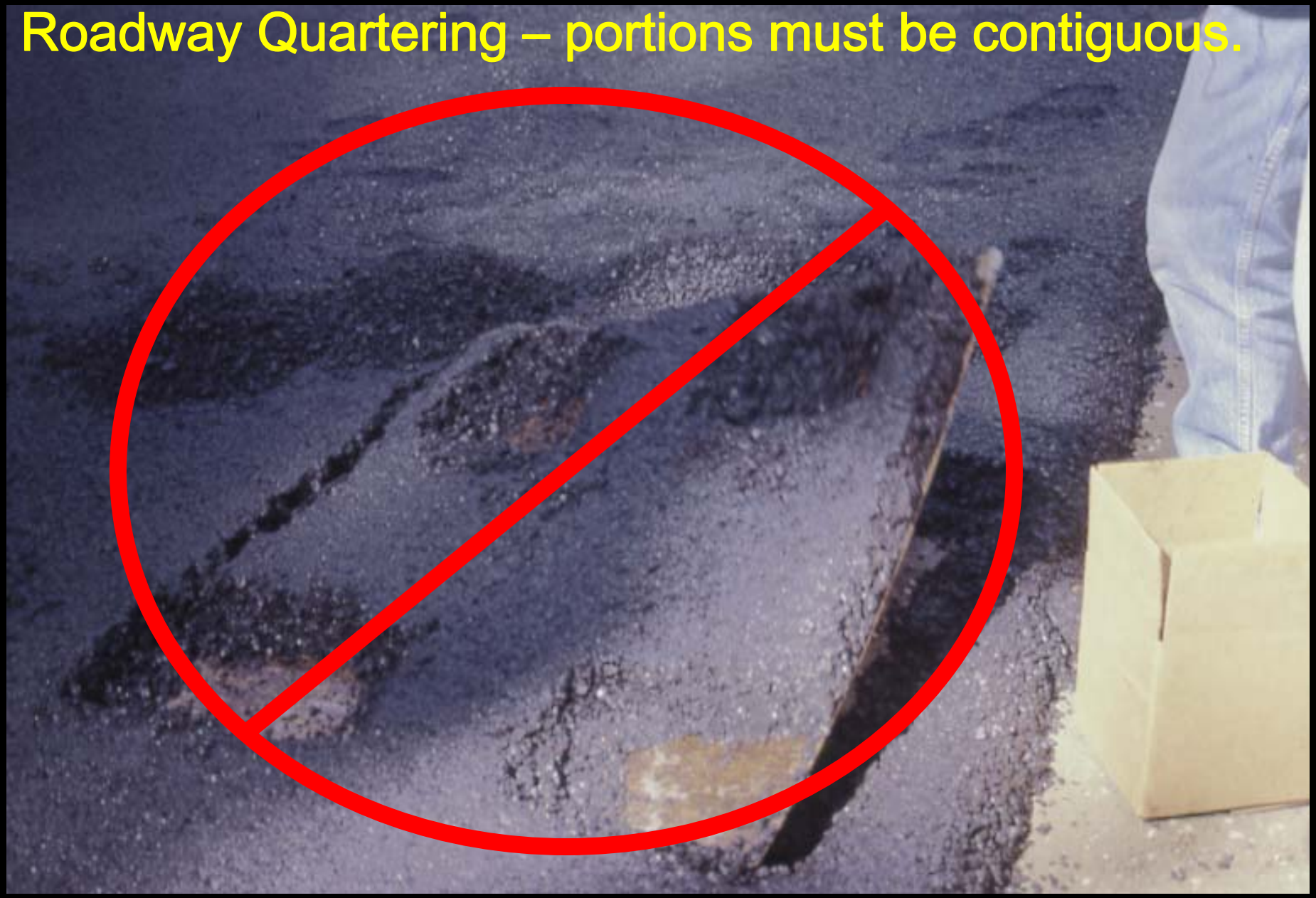

Do not use rubber-backed canvas quartering blankets for reducing bituminous mixtures.


Do not use canvas quartering blankets for reducing bituminous mixtures.


Consider Segregation


Consider
Segregation

Roadway Quartering – portions must be contiguous.



Appropriate Containers

- Sound Cardboard Boxes
  - For Hveem Mix Design – One box
    - 8 x 8 x 8 (approx. 65 to 75 percent full)
    - 12.75 x 9.5 x 4 (approx. 90 to 95 percent full)
  - For SuperPave Mix Design – Two boxes
    - 8 x 8 x 8 (approx. 90 to 100 percent full)
    - 12.75 x 9.5 x 4 (approx. 95 to 100 percent full)


PEP
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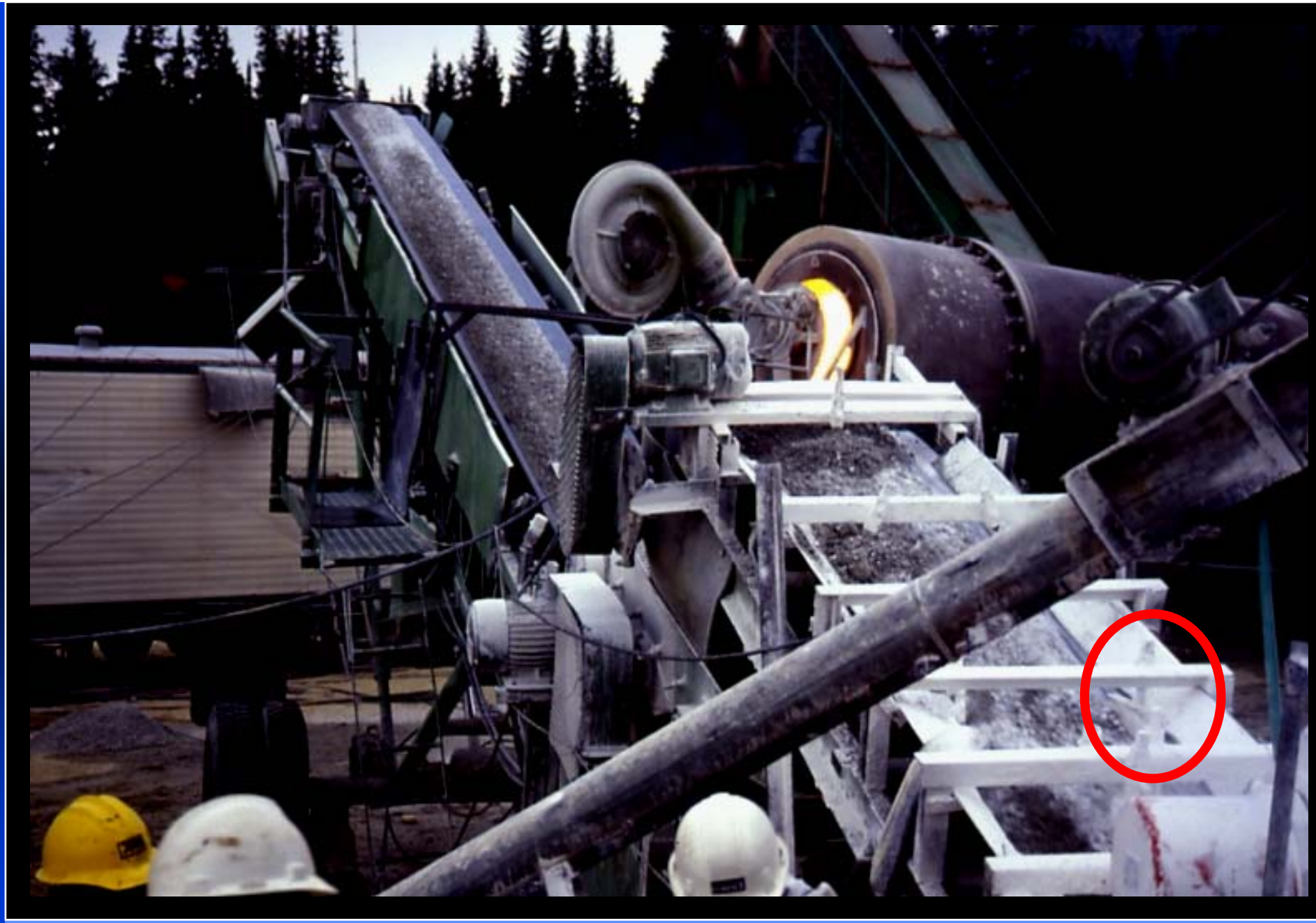
Sampling Hydrated Lime

AASHTO T 218

Appropriate Containers

- Wide Mouth One Gallon Can
  - Metal or Plastic

Incorporating Mineral Filler



The End